

CLAIMS

1. (Canceled)

2. (Previously presented) A method for scrambling communications formatted in a digital frame structure, comprising:
defining a scrambling structure;
selectively seeding the scrambling structure;
generating a selectable scrambling algorithm from the selectively seeded scrambling structure; and
scrambling communications in a frame using the selectable scrambling algorithm.

3. (Original) The method of claim 2 wherein selectively seeding the scrambling structure includes selectively initializing the scrambling structure with a seed mask.

4. (Original) The method of claim 3 further comprising:
forming superframes from a first plurality of frames; and
wherein selectively seeding the scrambling structure includes selecting a seed mask every superframe.

5. (Original) The method of claim 4 wherein selectively seeding the scrambling structure includes selecting a seed mask from a second plurality of seed masks; and

wherein scrambling communications using the selectable scrambling algorithm includes scrambling the communications with a second plurality of scrambling algorithms.

6. (Original) The method of claim 5 wherein defining a scrambling structure includes defining a scrambling structure with a third plurality of steps; and

wherein selectively seeding the scrambling structure includes forming seed masks including a third plurality of bits.

7. (Original) The method of claim 6 wherein forming superframes from a first plurality of frames includes forming superframes having frame synchronization bytes; and

wherein scrambling communications using a selectable scrambling algorithm includes synchronously scrambling the communications in each superframe in response to the superframe frame synchronization bytes.

8. (Original) The method of claim 6 in which the third plurality equals 16.

9. (Original) The method of claim 3 wherein selectively seeding the scrambling structure includes generating seed masks in response to a predetermined seed mask selection algorithm.

10. (Previously presented) The method of claim 2 further comprising:
transmitting the scrambled communications;
receiving the scrambled communications;
defining a descrambling structure;
selectively seeding the descrambling structure; and
descrambling communications using a descrambling algorithm responsive
to the selectively seeded descrambling structure.

11. (Original) The method of claim 10 wherein selectively seeding the
scrambling structure includes seeding the scrambling structure with a first seed mask;
and
wherein selectively seeding the descrambling structure including seeding
the descrambling structure with the first seed mask.

12. (Original) The method of claim 11 further comprising:
receiving seed mask information in an auxiliary channel; and
selecting seed masks in response to the receiving seed mask information;
and
wherein selectively seeding the descrambling structure includes seeding
the descrambling structure with the seed masks selected in response to the seed mask
information.

13. (Original) The method of claim 12 wherein receiving seed mask
information in an auxiliary channel includes receiving unscrambled overhead bytes; and
wherein selecting seed masks in response to the receiving seed mask
information includes selecting seed masks in response to receiving the unscrambled
overhead bytes.

14. (Original) The method of claim 13 further comprising:
establishing a seed mask generation key; and
wherein selecting seed masks in response to the receiving seed mask information includes using the unscrambled overhead bytes as a key to generate the seed masks.

15. (Original) The method of claim 13 further comprising:
storing seed masks; and
wherein selecting seed masks in response to receiving the unscrambled overhead bytes includes using the unscrambled overhead bytes as a key to retrieve the seed masks.

16. (Original) The method of claim 13 wherein receiving seed mask information in an auxiliary channel includes receiving unscrambled frame synchronization bytes.

17. (Original) The method of claim 13 wherein the scrambled communications are received through a first data link; and
wherein receiving seed mask information in an auxiliary channel includes receiving seed mask information through a second data link.

18. (Original) The method of claim 13 wherein receiving scrambled communications includes receiving scrambled communication superframes; and
wherein selectively seeding the descrambling structure includes selecting a seed mask every superframe.

19. (Original) A method for programmably descrambling a multidimensional digital frame structure, the method comprising:

- receiving scrambled communications;
- defining a descrambling structure;
- selectively seeding the descrambling structure
- generating a selectable descrambling algorithm responsive to the selective seeding of the descrambling structure; and
- descrambling the communications using the selectable descrambling algorithm.

20. (Original) The method of claim 19 wherein selectively seeding the descrambling structure includes periodically changing the descrambling structure seed mask.

21. (Original) The method of claim 20 wherein receiving scrambled communications includes receiving scrambled communication superframes; and

- wherein selectively seeding the descrambling structure includes selecting a seed mask every superframe.

22. (Original) The method of claim 21 wherein receiving scrambled communications includes receiving scrambled communication superframes, with each superframe including frame synchronization bytes; and

- wherein descrambling communications using a selectable descrambling algorithm includes synchronously descrambling the communications in each superframe in response to the superframe frame synchronization bytes.

23. (Original) The method of claim 22 further comprising:
receiving seed mask information in an auxiliary channel; and
selecting seed masks in response to the receiving seed mask information;
and
wherein selectively seeding the descrambling structure including seeding
the descrambling structure with the selected seed masks.

24. (Original) The method of claim 23 wherein receiving seed mask
information in an auxiliary channel includes receiving unscrambled overhead bytes; and
wherein selecting seed masks in response to the receiving seed mask
information includes selecting seed masks in response to receiving the unscrambled
overhead bytes.

25. (Original) The method of claim 24 further comprising:
establishing a seed mask generation key; and
wherein selecting seed masks in response to the receiving seed mask
information includes using the unscrambled overhead bytes as a key to generate the
seed masks.

26. (Original) The method of claim 24 further comprising:
storing seed masks; and
wherein selecting seed masks in response to receiving the unscrambled
overhead bytes includes using the unscrambled overhead bytes as a key to retrieve the
seed masks.

27. (Original) A system for programmably scrambling a multidimensional digital frame structure, the system comprising:

a transmitter including:

a scrambling algorithm generator having an input to accept a seed mask and an output to supply a scrambling algorithm responsive to the structure of the algorithm generator and the seed mask;

a transmit seed mask generator having a first input to accept seed selection commands and an output connected to the scrambling algorithm generator input to selectively supply seed masks;

a scrambler having a first input to accept communications and a second input connected to the scrambling algorithm generator output, the scrambler having an output to supply communications scrambled with the scrambling algorithm responsive to the selected seed mask.

28. (Original) The system of claim 27 wherein the transmit seed mask generator periodically receives commands to change the seed mask.

29. (Original) The system of claim 28 wherein the scrambler accepts communications formatted in superframes, with each superframe including a first plurality of frames;

wherein the transmit seed generator selects a seed mask every superframe; and

wherein the scrambling algorithm generator changes the scrambling algorithm every superframe.

30. (Original) The system of claim 28 wherein the scrambler accepts communications formatted in superframes, with each superframe including frame synchronization bytes; and

wherein the scrambler synchronously scrambles the communications in each superframe in response to the superframe frame synchronization bytes.

31. (Original) The system of claim 30 further comprising:

a receiver including:

a descrambling algorithm generator having an input to accept a seed mask and an output to supply a descrambling algorithm responsive to the structure of the algorithm generator and the seed mask;

a receiver seed mask generator having a first input to accept seed selection commands and an output connected to the descrambling algorithm generator input to selectively supply seed masks; and

a descrambler having a first input to accept scrambled communications and a second input connected to the descrambling algorithm generator output, the descrambler having an output to supply communications descrambled with the descrambling algorithm responsive to the selected seed mask.

32. (Original) The system of claim 31 wherein the transmit seed generator accepts commands to generate a first seed mask;

wherein the scrambling algorithm generator generates a first algorithm in response to receiving the first seed mask;

wherein the scrambler scrambles communications using the first algorithm;

wherein the receiver seed generator accepts commands to generate a first seed mask;

wherein the descrambling algorithm generator generates a first algorithm in response to receiving the first seed mask; and

wherein the descrambler descrambles communications using the first algorithm.

33. (Original) The system of claim 32 wherein the receiver accepts seed mask information in an auxiliary channel and supplies seed mask commands to the receiver seed mask generator in response to the seed mask information; and

wherein the receiver seed mask generator generates a first seed masks in response to the received seed mask information;

wherein the descrambling algorithm generator generates a first algorithm in response to the first seed mask; and

wherein the descrambler descrambles the communications in response to the first algorithm.

34. (Original) The system of claim 33 wherein the receiver receives seed mask information in an auxiliary channel as unscrambled overhead bytes; and

wherein the receiver seed generator generates the first seed mask in response to the receipt of the unscrambled overhead bytes.

35. (Original) The system of claim 33 wherein the receiver receives seed mask information in an auxiliary channel as unscrambled overhead bytes; and
wherein the receiver seed generator retrieves a seed mask from storage in response to the receipt of the unscrambled overhead bytes.

36. (Original) The system of claim 33 wherein the receiver receives seed mask information in an auxiliary channel as unscrambled frame synchronization bytes.

37. (Original) The system of claim 33 wherein the receiver accepts scrambled communications through a first data link and the auxiliary channel through a second data link, independent of the first data link.

38. (Original) The system of claim 33 wherein descrambler receives scrambled communication formatted into superframes; and
wherein the receiver seed generator accepts commands to generate a new seed mask every superframe.

39-41. (Canceled)

42. (New) A method for communicating among nodes in a network of communication nodes, the method comprising:

- sending a descrambling key to selected nodes in the network;
- receiving the descrambling key at the selected nodes; and
- selecting a seed mask in response to the descrambling key;
- generating a scrambling algorithm from the first seed mask;
- generating a descrambling algorithm from the first seed mask;
- scrambling a communication in the network using the scrambling algorithm; and
- descrambling the communication at the selected nodes using the descrambling algorithm.